# Information and Tools to Guide
Landscape Conservation in the Appalachians

The Appalachian Landscape Conservation Cooperative (LCC) funds research that addresses the conservation community's top science needs and develops tools to enhance landscape conservation within the region. By identifying, prioritizing, and supporting fundamental scientific research, the LCC is fostering the development and effective application of vital information and products to help plan and manage for the conservation of aquatic and terrestrial systems throughout the region.
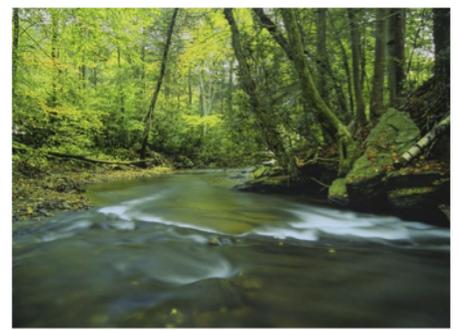
Appalachian LCC Funded Research and Science Products

Assessing Future Energy Development across the Appalachians
This tool enables decision makers to evaluate the scale, scope, and intensity of potential energy development in the Appalachian LCC region. The map visualization tool highlights potential impacts at a landscape scale in order to assist the development of strategies that avoid and mitigate impacts to areas important for regional biodiversity.

Products
- Models of future development potentials for coal mining, gas drilling, and wind farm creation
- Web-based map visualization tool with spatially explicit energy development projections

Principle Investigator
- Judy Dunscomb, Senior Conservation Scientist, The Nature Conservancy: jdunscomb@tnc.org

Learn more
- Energy Assessment Research and Tools Page - http://applcc.org/assessing-future-energy-development
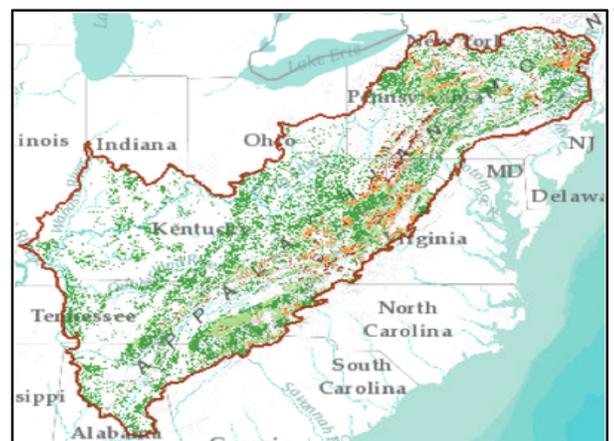
Mapping tool can display data layers showing intersection between potential high probability energy development and important natural resources.

Assessing Vulnerability of Species and Habitats to Large-scale Impacts

This collection of assessments looks at how vulnerable 41 species and 3 habitats in the Appalachian region are to large-scale impacts such as climate change. Users can search assessments by relative vulnerability scores, conservation status rankings, higher taxonomy, and state or subregion of interest, as well as explore previously completed assessments for 700 species and several habitats compiled by past research.

Products
- New Vulnerability Assessments of 41 Species and 3 Habitats
- Previous Assessments for 700 Species
- Final Report: Climate Change *Vulnerability Assessments in the Appalachian LCC Region*

Principle Investigator
- Lesley Sneddon, National Ecologist, NatureServe: Lesley_Sneddon@natureserve.org

Learn More
- Assessing Vulnerability Research Page - http://applcc.org/research/vulnerability-assessments

Classification and Mapping of Cave and Karst Resources

Researchers assembled and summarized pre-existing efforts to collect and present karst resource information and then identified the most appropriate classification system to use for karst habitats within Appalachia. Intricate models were developed to further classify the diversity within known cave and karst formations as well as generated predictions on what level of biodiversity might be expected in cave and karst systems.

Products
- Maps and spatial datasets for examining relationships between environmental factors, biodiversity, and distribution within karst areas
- Visual survey guides users through research accomplishments as well as identifies new questions to tackle for future research

Principle Investigator
- David Culver, Professor Emeritus, American University: dculver@american.edu

Learn more
- Cave and Karst Classification and Mapping Research Area - http://applcc.org/classification-mapping-cave-karst-resources

Protecting the beauty and mystery of caves as well as the distribution and richness of biological life within karst landscapes is a bold scientific and conservation challenge.

Ecosystem Benefits and Risks

This clearinghouse of research, datasets, and maps provide resources for planners, managers, and citizens to understand essential services that nature provides people, and assess threats to sustaining them in the Appalachians in the face of climate change and other drivers of landscape change.

Products
- Descriptions of regional ecosystem services
- Identification of threats to regional ecosystem services
- Conservation Atlas of ecosystem services with access to collections of data layers and maps

Principle Investigator
- Lars Pomara, Ecologist, U.S. Forest Service: lazarusypomara@fs.fed.us

Learn more
- Ecosystem Services Conservation Atlas - http://applcc-ecosystemservices.org/
- Ecosystem Benefits and Risks Research Area - http://applcc.org/ecosystem-risks-benefits

This clearinghouse of information and tools integrates the societal value of ecosystem benefits with future threats to inform planning and management.

Landscape Conservation Design – Appalachian Naturescape

This modeling effort identified ecologically significant terrestrial and aquatic landscapes and corridors of connectivity that are critical to conserving regional biodiversity into the future. The final design framework will provide public land managers, nonprofit organizations, and private landowners the ability to incorporate landscape data into local decisions and conservation actions.

Products
- Report and videos on phase I and II project results
- A map gallery and data displaying spatial extent of the conservation design elements

Principle Investigator
- Paul Leonard, Rob Baldwin, and Daniel Hanks
- Questions? Contact coordinator@applcc.org

Learn more
- Appalachian LCC Landscape Conservation Design Research Page - http://applcc.org/research/interactive-conservation-design
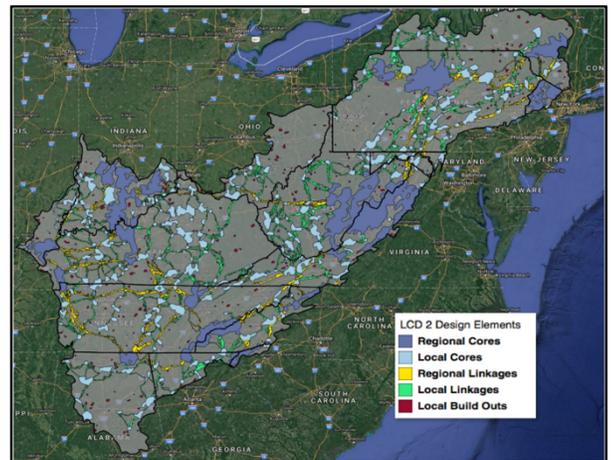
Our Landscape Conservation Design integrates key landscape cores and corridors from Phase I with aquatic condition and connectivity layers from Phase II.

Riparian Restoration Decision Support Tool

This tool identifies streams and riverbanks that lack tree cover and shade for vulnerable cold-water stream habitats. By locating the best spots to plant trees in riparian zones, resource managers can provide shade that limits the amount of solar radiation heating the water.

Products
- Final Report: *Riparian Prioritization and Status Assessment for Climate Change Resilience of Coldwater Stream Habitats within the Appalachian and Northeast Regions*
- Riparian Restoration for Climate Change Resilience Decision Support Tool

Principle Investigator
- Jason Coombs, Conservation Ecologist, UMass Amherst: jcoombs@cns.umass.edu

Learn more
- Riparian Restoration Research and Tools Page – http://applcc.org/riparian-restoration

Stream Impacts from Water Withdrawals in the Marcellus Shale Region

How may the region's surface freshwater supply – and the health of natural systems delivering this resource – be impacted and altered in the coming years under increasing water withdrawals. Using sophisticated modeling techniques, researchers tested and identified various flow regimes to help resource managers, industry and others make more informed decisions in achieving sustainable river and stream flows that balance the needs of society and healthy ecosystems.

Products
- Final Report: *Environmental Flow Analysis for the Marcellus Shale Region*
- Inventory of flow models and underlying data sources from instream monitoring networks

Principle Investigator
- Todd Walter, Director, New York State Water Resources Institute: mtw5@cornell.edu

Learn more

Stream Impacts from Water Withdrawal Research Page - http://applcc.org/research/stream-impacts-water-withdrawals
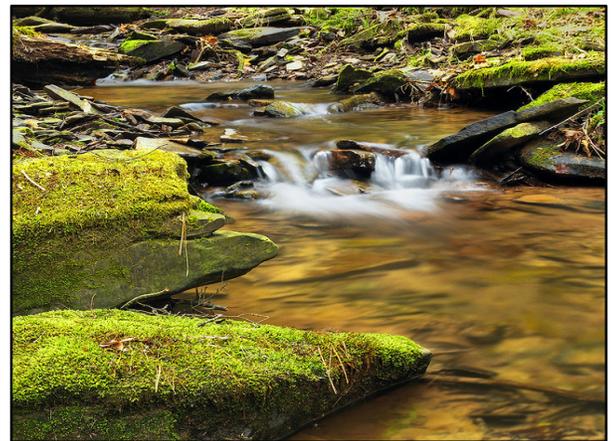
A balance between human needs and flows needed to sustain aquatic ecosystems can be realized if water withdrawal regulations vary with stream size and season.

Stream Classification System – A Uniform System across the Entire Eastern U.S.

This consistent classification system and map for stream and river systems represents natural flowing-water aquatic habitats across the entire Appalachian region. By bringing together existing geomorphic and hydrologic classifications systems from different states, this product can be used to inform conservation decisions that will offer the greatest long-term benefit for regional aquatic ecosystems.

Products
- Shapefiles and metadata of the stream classification
- Data on stream chemistry, confinement, gradient, stream size and hydrologic classes
- Literature review, final report, and story map on stream classification system

Principle Investigator
- Arlene Olivero Sheldon, Aquatic Ecologist, The Nature Conservancy: Arlene_olivero@tnc.org

Learn more
- Stream Classification Research Page - http://applcc.org/research/stream-classification

LEARN MORE ABOUT LCC SCIENCE

Appalachian LCC: http://www.applcc.org/   **Contact:** communications@applcc.org